STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86
(For candidates admitted during the academic year 2015–16)

SUBJECT CODE: 15CH/MC/GC14

B.Sc. DEGREE EXAMINATION, NOVEMBER 2015
BRANCH IV- CHEMISTRY
FIRST SEMESTER

REG.NO ……..

COURSE : MAJOR CORE
PAPER : GENERAL CHEMISTRY
TIME : 30 MINUTES **MAX.MARKS : 30**

Section- A
Answer all questions **(30 x 1 = 30)**

Choose the correct answer:

1. The bond order in N_2 molecule is
   a) 0 b) 1 c) 2 d) 3

2. The hybridization of Boron in BF_3 is
   a) sp b) sp^2 c) sp^3 d) sp^3d

3. Which is not a magic number
   a) 8 b) 50 c) 85 d) 126

4. Thorium series is also known as
   a) 4n b) 4n +1 c) 4n+2 d) 4n+3

5. The bond that undergoes heterolytic cleavage most easily is
   a) C – O b) C – C c) C – H d) O – H

6. Which is not an electrophile?
   a) H_3O^+ b) $AlCl_3$ c) NH_3 d) BF_3

7. The number of α – hydrogen in $CH_3 – CH = CH_2$ molecule is
   a) 1 b) 2 c) 3 d) 5

8. The compressibility factor of an ideal gas is
   a) 0 b) 1 c) infinity d) negative

9. The ratio of most probable, average and root mean square velocity is
   a) 1: 1.224: 1.128 b) 1: 1.128 : 1.1224 c) 1: 1.128 : 1.524 d) 1: 1.178: 1.524

10. The heat of a reaction at constant pressure is given by
    a) ΔE b) ΔG c) ΔH d) ΔS

Fill in the blanks:

11. The shape of a water molecule is _____.
12. Covalent compounds are _____ conductors of electricity.
13. Atoms of different elements with same number of neutrons are called _____.
14. 1 amu = _____ MeV.
15. The IUPAC name of $CH_2 = CH - CH_2 - CH_2Cl$ is _____
16. Hyper conjugation is also known as_____..
17. The migration of an atom or a group from one atom to the other within the same molecule is called _____ reaction.
18. The expression for inversion temperature is _____.
19. The ideal gas equation is _____.
20. The enthalpy of neutralization of strong acid against strong base is _____ .

State True or False:

21. The strength of a bond is directly proportional to its bond order.
22. The penetrating power of α, β and γ is in the order $\alpha > \beta > \gamma$.
23. Mesomeric effect occurs in unsaturated molecules.
24. Homolytic fission leads to the formation of free radicals
25. Heat of combustion is always exothermic.

Answer in a single line:

26. What is the use of Born – Lande equation?

27. What is mass defect?

28. State Huckel's rule.

29. Define critical temperature.

30. What is enthalpy of fusion?

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Section B

Answer any five questions: **(5×6=30)**.

1. State and explain Fajan's Rules.
2. Discuss the bond order in O_2.
3. Explain nuclear stability through n/p ratio.
4. Compare the stabilities of primary, secondary and tertiary carboinum ions.
5. Discuss the inductive effect with suitable examples.
6. Vander Waal's constants of a gas are $a = 0.751\ dm^6$ atm mol^{-2} and $b = 0.0226\ dm^3\ mol^{-1}$. Calculate its critical constants.
7. Write short notes on Heat of Formation and its significance.

Section C

Answer any two questions: **(2×20=40)**.

8. a) Explain Born Haber cycle with an example. (5)
   b) Discuss the shapes of NH_3, PCl_5 and SF_4 applying VSEPR theory (10)
   c) Describe the working of Geiger – Muller counter. (5)

9. a) Explain nuclear fusion. (5)
   b) What do you understand by substitution, addition, elimination reactions, resonance and tautomerism? Give one example each. (15)

10. a) Discuss Vander Waal's equation of state. (10)
    b) Explain Maxwell distribution of molecular velocities (6)
    c) Write short notes on Hess' law of constant heat summation. (4)

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